AT-9900 SERIES
Hardware Reference

AT-9924T
AT-9924SP
AT-9924T/4SP

Allied Telesyn

AT-9900 Series Hardware Reference
Document Number C613-03084-00 REV A.

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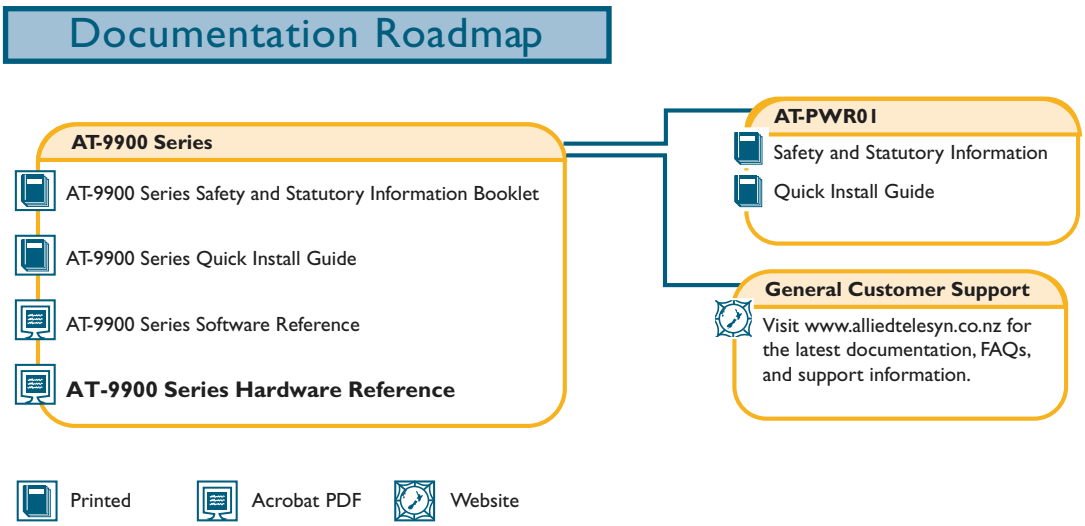


Models Covered By This Reference

This Hardware Reference includes information on these models:

- AT-9924T/4SP
- AT-9924T
- AT-9924SP
- AT-PWR01 (either AC or DC power supply unit)
- AT-FAN01 (fan only module)

Find the latest *AT-9900 Series Hardware Reference* at http:// www.alliedtelesyn.co.nz/support.

Why You Should Read This Reference

Use this Reference to familiarise yourself with the AT-9900 Series switches and their hardware features, including the power supply units (PSUs). The information found in this Reference will assist you with the process of installing and maintaining your AT-9900 Series switch.

Keep this Reference (or its CD-ROM) in a safe place, you will need it if you purchase switch expansion options (DIMM) in the future.

Note This Reference does not cover software configuration or software installation procedures. For information on software, refer to the *AT-9900 Series Software Reference*.

Where To Find More Information

The documentation and tools CD-ROM bundled with each switch contains the complete document set for AT-9900 Series switches and their power supply units, as well as tools for switch management.

The documentation and tools CD-ROM includes:

- The *AT-9900 Series Software Reference*, which provides detailed information on configuring the switch and its software.
- The *AT-9900 Series Quick Install Guide*, which describes how to install your switch and includes statutory and safety information.
- The *AT-PWR01 Quick Install Guide*, which describes how to install power supply units and fan only modules in your switch and includes statutory and safety information.

You can also download these documents from the AT-9900 Series support site at http:// www.alliedtelesyn.co.nz/support/at9900.

Hardware Description

This section provides an overview of the hardware features of the AT-9900 Series switches.

Switch Overview

AT-9900 Series switches are high density Gigabit Ethernet multi-layer switches, perfect for the high-density rack environment where space is at a premium.

Dimensions

- Height = 44.5 mm (plus 5.1 mm if the rubber feet are used)
- Width = 440 mm (excluding rack-mounting brackets)
- Depth = 440 mm (excluding PSU handles)
- Weight = Not more than 8.5 kg (includes single power supply unit and fan only module)

Mounting system

- 1U rack mounting; 19 inch rack-mount kit as standard
- Optional wall-mount rack kit

Environmental conditions

- Operating temperature range: 0º C to 50º C (32º F to 122º F)
- Storage temperature range: -25º C to 70º C (-13º F to 158º F)
- Operating humidity range: 5% to 80% non-condensing
- Storage humidity range: 5% to 95% non-condensing
- Operational altitude: 3,050 metres maximum (10,000 feet)

Regulatory standards

- EMC: EN55022 class A, FCC class A, and VCCI class A. EN61000-3 levels 2 (Harmonics), and 3 (Flicker) (AC models only)
- Immunity testing to EN55024
- Safety: UL60950-1, CAN/CSA-C22.2 NO. 60950-1-03, EN60950-1, AS/NZS60950, EN60825-1
- Certification: UL, cUL, TUV

LEDs

- Port, System, and power supply unit status LEDs
- A complete list of LEDs and their functions is described in "LEDs and What They Mean" on page 23

Power supply units

- Power supply units (PSUs) are hot-swappable and load share
- AC or DC PSU options

Dimensions:

- Height: 40.9 mm
- Width: 193 mm
- Depth: 130 mm

AC models

- Universal 100/240 VAC 47/63 Hz input
- Maximum continuous current draw, 2.2 A at 100 V, 1.1 A at 230 V
- Maximum inrush current (cold start at 25º C/77º F), 70 A at 240 V, 32 A at 115 V

Important information for service personnel:

CAUTION: double pole/neutral fusing

The rating of fuses FH101 and FH102 is 250 V, 5 A

DC models

- 40 V to 60 V, 48 V nominal
- Supports either positive grounded or negative grounded operation
- Maximum continuous current draw, 3.9 A at 40 V
- Maximum standby current, 100 mA
- Run/Standby switch

Switching core

- Application-Specific Integrated Circuit (ASIC) switch chip
- High performance IPv4 switching
- High performance IPv6 switching (AT-9924T/4SP only)
- Shared 32 MByte DDR-SDRAM packet buffer

Processing core

- 400 MHz RISC Processor
- 16 MBytes of fixed flash (with provision for an additional 16 MBytes)
- CompactFlash socket on the front panel for hot swappable expansion of flash memory up to 128 MBytes
- 512 kBytes of NVSRAM
- Silicon ID chip storing serial number, board ID, MAC address, and hardware revision level

AT-9924T and AT-9924SP

- 128 MBytes Synchronous DRAM (expandable to 256 MByte or 512 MByte with DIMM)

AT-9924T/4SP

- 256 MByte Synchronous DRAM (expandable to 512 MByte with DIMM)
- 512 MByte Synchronous DRAM is required if AT-ACC01 network processor accelerator card fitted

Asynchronous serial port

- Up to 115 kbps
- Standard DB9 female RS-232 connector

Network processor accelerator card (AT-9924T/4SP only)

- Optional network processor accelerator card provides accelerated IPv6 unicast and multicast routing in hardware
- 512 MBytes Synchronous DRAM required, giving 64 K IPv6 static routes
- 4 K multicast table
- 1000 accelerator hardware filters

AT-9900 Series Switch Models

This section provides hardware descriptions about individual switch models.

AT-9924T/4SP

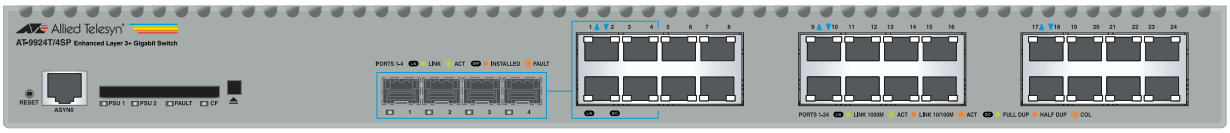
Key features:

- Auto-negotiating Multi-layer Gigabit Switch
- Optional AT-ACC01 network processor accelerator card
- 24-port 10BASE-T/100BASE-TX/1000BASE-T (RJ-45 connectors)
- 4-port Small Form Factor Pluggable (SFP) uplink sockets
- Hot-swappable load sharing PSUs

Note Only 24 ports are operational at one time.

The RJ-45 ports 1 to 4 use the same physical interface as the SFP ports 1 to 4. When a SFP is inserted into a SFP port the corresponding RJ-45 port is disabled. For example, if a SFP is inserted in SFP port 1 then RJ-45 port 1 is disabled. All other RJ-45 ports function as normal and when the SFP is removed from port 1 the RJ-45 port 1 is operational.

Figure 1-1: Front panel of the AT-9924T/4SP switch



AT-9924T

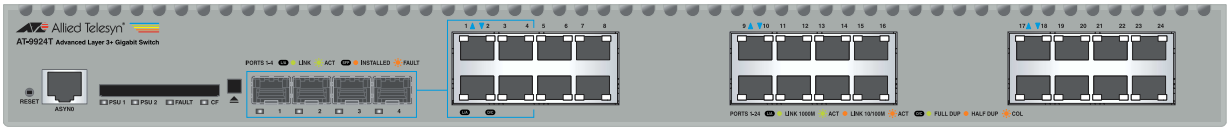
Key features:

- Auto-negotiating Multi-layer Gigabit Switch
- 24-port 10BASE-T/100BASE-TX/1000BASE-T (RJ-45 connectors)
- 4-port Small Form Factor Pluggable (SFP) uplink sockets
- Hot-swappable load sharing PSUs

Note Only 24 ports are operational at one time.

The RJ-45 ports 1 to 4 use the same physical interface as the SFP ports 1 to 4. When a SFP is inserted into a SFP port the corresponding RJ-45 port is disabled. For example, if a SFP is inserted in SFP port 1 then RJ-45 port 1 is disabled. All other RJ-45 ports function as normal and when the SFP is removed from port 1 the RJ-45 port 1 is operational.

Figure 1-2: Front panel of the AT-9924T switch



AT-9924SP

Key features:

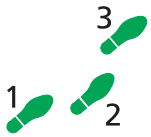
- Auto-negotiating Multi-layer Gigabit Switch
- 24-port Small Form Factor Pluggable (SFP) uplink sockets
- Hot-swappable load sharing PSUs

Figure 1-3: Front panel of the AT-9924SP switch

Online Documentation

This section provides a step-by-step guide to accessing online documentation. Your computer must have Adobe Acrobat Reader installed to view online documentation.

How to access the CD-ROM and online documentation



Follow these steps to access the CD-ROM and online documentation:

1. **Insert the Documentation and Tools CD-ROM in the CD-ROM drive.**

2. **If the Welcome screen does not appear.**

   Select "Run" from the Start Menu (Windows 95, 98, 2000 or NT 4.0).

   Type d:\start.exe (where d: is the CD-ROM drive letter) and click OK.

3. **To view a document.**

   Click on the document title.

4. **To navigate around PDF documents.**

   Use the toolbar buttons, keyboard shortcuts, or commands from the Document menu to page through the document.

   Click on a bookmark, thumbnail or hypertext link to jump to a specific section or topic.

   Use the Search command to search for keywords or phrases.

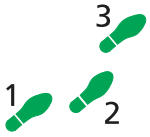
   For more information about using the Adobe Acrobat Reader, select "Reader Guide" from the Help menu.

5. **To install any of the tools included on the CD-ROM.**

   Click on a link in the Welcome screen.

How to Use AT-TFTP Server

This section provides information on how to access and use AT-TFTP Server. AT-TFTP Server can be used to transfer configuration files as well as to download software patches and releases.



To use AT-TFTP Server, follow these steps:

1. **If AT-TFTP Server has not yet been installed.**

   Install it now from the AT-9900 Series Documentation and Tools CD-ROM.

   Choose AT-TFTP Server from the Start > Programs > Allied Telesyn > AT-TFTP Server menu.

2. **To set preferences for the AT-TFTP Server.**

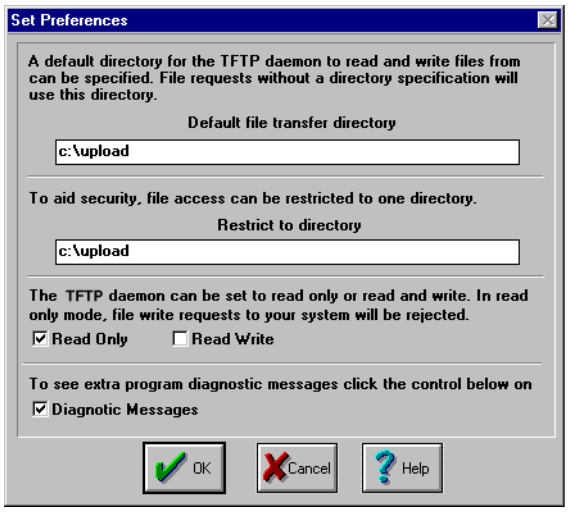
   Select "Options" from the File menu to display the "Set Preferences" dialog box.

   The "Default file transfer directory" field specifies the directory that AT-TFTP Server will read from or write to for file requests that do not include a directory specification.

   To prevent unauthorised access to private directories, enter a path name in the "Restrict to directory" field. AT-TFTP Server will use only the specified directory, even if file requests contain references to other directories.

   Select "Read only" to prevent files being written to the PC. To use the PC to archive scripts created using the switch's **create config** command, select "Read Write".

   Make any required changes and click "OK".


Set Preferences
A default directory for the TFTP daemon to read and write files from can be specified. File requests without a directory specification will use this directory.
Default file transfer directory
c:\upload
To aid security, file access can be restricted to one directory.
Restrict to directory
c:\upload
The TFTP daemon can be set to read only or read and write. In read only mode, file write requests to your system will be rejected.
Read Only
Read Write
To see extra program diagnostic messages click the control below on
Diagnotic Messages
OK
Cancel
Help

3. **To load a file from AT-TFTP Server to the Switch.**

   On a terminal connected to the RS-232 Terminal Port (ASYN0), type the command:

   ```
   load method=tftp file=filename server=ipadd dest=flash
   ```

   where *filename* is the name of the file to download and *ipadd* is the IP address of the PC running AT-TFTP Server.

4. **To save a TFTP Server log.**

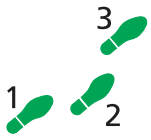
   Select "Save As" from the File menu.

   TFTP requests are logged to the AT-TFTP Server main window.

How to Use Windows Terminal and Windows Hyperterminal

You can use a PC running terminal emulation software as the manager console, instead of a terminal. There are many terminal emulation applications available for PCs, but the most readily available are the Terminal and HyperTerminal applications included in Microsoft Windows 95, 98, 2000, and Windows NT 4.0. In standard Windows installations, HyperTerminal is located in the Start > Programs > Accessories menu.

The key to successful use of terminal emulation software with the switch is to configure the software and switch with matching communications parameters. How to configure Windows Terminal and HyperTerminal for the default RS-232 ASYN0 settings on the switch are described below, but the same principles apply to other terminal emulation programs.

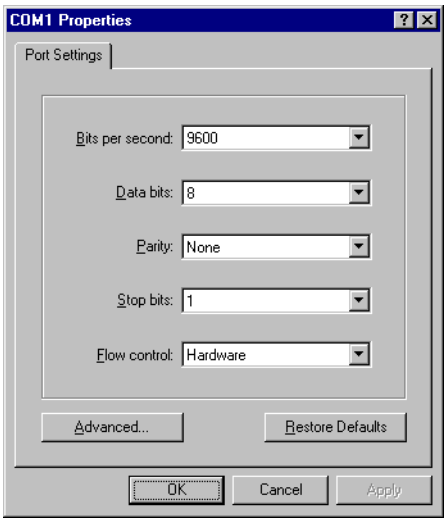


To configure Windows HyperTerminal for Windows 95, 98, 2000, & NT 4.0.

1. **In Windows, select:**
   - Programs > Accessories > HyperTerminal.
   - Double-click the Hypertrm.exe icon.
2. **In the Connection Description dialog box:**
   - Enter a name for the connection (e.g., AT99001)
   - Select an icon from the scrolling list.
   - Click “OK”.
3. **In the Phone Number dialog box:**

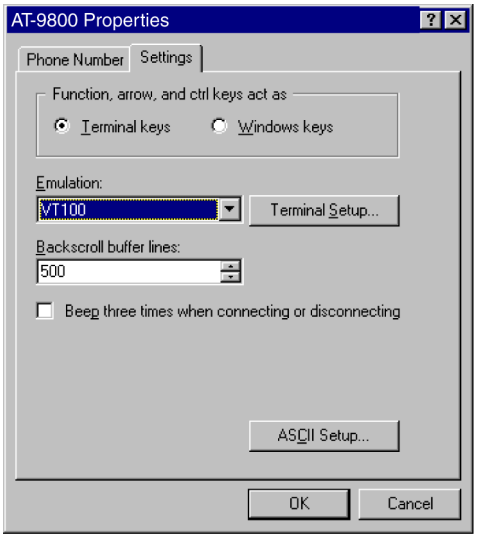
   From the “Connect using:” drop-down list, select:
   - “Direct to Com *n*” Where “COM *n*” is the COM port on the PC used to connect to the switch.
   - Click “OK”.

4. **In the COM*n* Properties dialog box, set:**
   - Bits per second: 9600.
   - Data bits: 8.
   - Parity: None.
   - Stop bits: 1.
   - Flow control: Hardware.
   - Click “OK”.



5. **From the File menu, select:**
   - “Properties”

   In the Connection Properties dialog box, click the Settings tab and set:
   - “Function, arrow, and ctrl keys act as” to “Terminal keys”
   - “Emulation” to VT100.

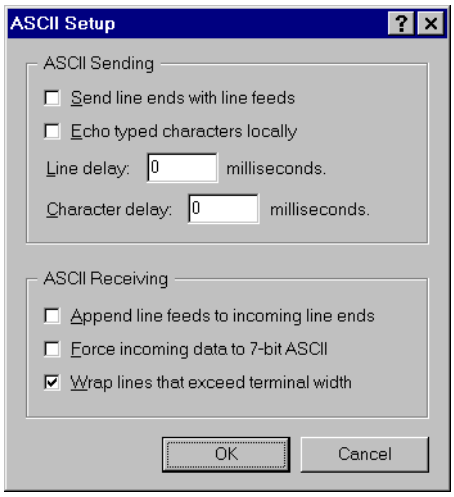


6. **Click "ASCII Setup" to display the ASCII Setup dialog box. Uncheck:**

   - "Echo typed characters locally".
   - "Append line feeds to incoming line ends".

   Set other parameters as required.

   - Click "OK" twice to close all dialog boxes.



7. **Save the current session. From the File menu, select:**

   - "Save".

   This creates a connection icon with the name you assigned in the HyperTerminal group. To use the configuration:

   - Double-click the connection icon in the HyperTerminal group.

   When the HyperTerminal window appears, press:

   - [Enter] a couple of times.

   The switch's log in prompt will appear.

Switch Start-up

This section outlines the log in and start-up procedures for your switch. Although the switch will perform basic switching operations without being configured, you will need to go through these log in and start-up procedures if you wish to configure the switch and access its full switching capabilities.

Before you can log in, the switch's chassis must have at least one power supply unit installed and operational, with either a power supply unit or fan only module installed in the other bay.

How to log in

To log in you must first connect the switch to a terminal or PC. You can do this via the RS-232 Terminal Port (ASYN0). A terminal cable suitable for use with ASYN0 is supplied with each switch.

Use the supplied terminal cable, or a cable you have made following the instructions in "Useful Cables" on page 19, and connect your terminal or PC to ASYN0 on the switch.

Set the communication parameters on your terminal or terminal emulation program to:

- Baud rate: 9600
- Data bits: 8
- Parity: None
- Stop bits: 1
- Flow control: Hardware

How to configure emulation software is described in "How to Use Windows Terminal and Windows Hyperterminal" on page 11.

Ensure that any power switches are in the **on** position and that the switch is receiving power.

After the switch has booted, the login prompt appears. If the login prompt does not appear, press [Enter] two or three times.

When the switch boots for the first time it automatically creates an account with manager privileges. The account has the log in name **manager** and the password is **friend**.

At the log in prompt, enter the log in name and password.

```
Log in: manager
Password: friend
```

The switch's command prompt appears. Now use the Command Line Interface (CLI) to configure the switch.

Warning Change the password as soon as possible because a manager account left with the default password is a serious security risk. Remember the new password as there is no way to retrieve it if it is lost.

To change the account password, use the command:

```
set password
```

How to configure the switch is described in detail in the *AT-9900 Series Software Reference*.

How to access help

Before help is used for the first time, you must define the help files. To define the files, enter:

```
set help=help-filename
```

where *help-filename* is the name of a help file stored in flash.

To see a list of files stored in flash, enter:

```
show file
```

Help files have an **.hlp** extension.

To display a list of help topics, enter:

```
help
```

To display help on a specific topic, enter:

```
help topic
```

Alternatively, type a question mark (?) at the end of a partially completed command to see a list of valid options.

Start-up procedures

When the switch starts up following either a power cycle or an operator-initiated reboot (using the Reset button or **restart** command), a series of start-up messages is sent to the terminal or PC connected to ASYN0 (Figure 1-4 on page 15).

Figure 1-4: Switch start-up messages

```
INFO: Self tests beginning.
INFO: RAM test beginning.
PASS: RAM test, 131072k bytes found.
INFO: BBR tests beginning.
PASS: BBR test, 512k bytes found.
INFO: Self tests complete
INFO: Downloading switch software.
Force EPROM download (Y) ?
INFO: Initial download succeeded
INFO: Executing configuration script <boot.cfg>
INFO: Switch startup complete

Manager >
```

After the self tests are complete, the manager is given the option of forcing a mandatory boot from the EPROM (flash) release. The message:

```
Force EPROM download (Y)?
```

is displayed on the terminal or PC connected to ASYN0 and the switch pauses. If a key is not pressed within a few seconds, the start-up process will continue and all steps in the sequence will be executed. Press selected keys on the terminal immediately after the "Force EPROM download" message is displayed to change the switch start-up process.

Table 1-1: Switch start-up sequence keystrokes

Pressing key...	Forces the switch to...
[Y]	Load the EPROM release, with no patch.
[S]	Start with the default configuration. Any boot script is ignored.
[Ctrl/D]	Enter diagnostics mode.

During the start-up process the switch will generate four different types of messages. All messages are preceded by one of the words INFO, PASS, FAIL, or ERROR. The significance of these words is shown in the table below.

Table 1-2: Switch start-up message classes

Message	Meaning
INFO	An action will be taken by the system.
PASS	A test has been completed successfully.
ERROR	An error message that a test has failed, but the system will continue to operate.
FAIL	An error message that a fatal error condition has caused the system to halt in an unrecoverable fashion.

The following table describes start-up messages and their meanings.

Table 1-3: Switch start-up messages and their meanings

Message	Description
INFO: Self tests beginning.	The code loader tests are about to begin.
INFO: RAM test beginning	The RAM tests are about to begin.
PASS: RAM test, 131072k bytes found	The RAM test passed, and the indicated amount of memory was found and will be used by the switch.
ERROR: RAM test 5. Error address = 00345678	A RAM test failed, at the given address. In the example, it was the fifth test run. The RAM test repeats until it passes, so a number of messages like this may appear. This fault means that the memory system is faulty. If the fault continues, contact your Authorised Allied Telesyn distributor or reseller immediately.
INFO: BBR tests beginning	The BBR battery tests are about to begin.
PASS: BBR test. Battery OK	The BBR battery tests passed.
ERROR: BBR Battery low	The BBR battery test failed, indicating that the battery is running low. The BBR battery will need to be replaced. Contact your Authorised Allied Telesyn distributor or reseller.
PASS: BBR test, 512k bytes found	The BBR size/location test passed, with the indicated amount of BBR found.

Table 1-3: Switch start-up messages and their meanings (Continued)

Message	Description
FAIL: BBR test. Error address = 12345678	The BBR size/location test failed at the given location. The test at this location failed, indicating the end of memory, but a valid location was discovered in the 255 long words following this location. The BBR system will need to be replaced. Contact your Authorised Allied Telesyn distributor or reseller.
FAIL: BBR test, only 16k bytes found	The BBR size/location test completed, but only the displayed amount of memory was found. This amount is less than the minimum required to run the switch software.
INFO: Self tests complete	The start-up tests have finished.
INFO: Downloading switch software	The process of downloading the switch software and vector table from ROM is about to begin.
ERROR: Code load retried FAIL: Code load failed	The load of the code from ROM to RAM failed. The load is retried a number of times. Each time a failure occurs, the ERROR message is displayed. If the maximum number of attempts is reached, the FAIL message is displayed.
INFO: Initial download succeeded	The start-up tests and download are complete, and the switch software is about to be started. If the default install is a compressed release, the release will now be decompressed. This may take a few seconds.
INFO: Downloading compressed release. This may take up to 1 minute... INFO: Loading software into memory. This may take up to 1 minute...	The main switch software is about to be loaded into RAM. If the release is a compressed release, the release will be decompressed.
INFO: Executing configuration script <script-name>	The configuration commands stored in <script-name> are being executed. If an error is found in the script, one or more ERROR messages will be displayed.
INFO: Switch startup complete	The start-up process is complete and the switch will now perform basic switching operations.

Further configuration is necessary if you wish to access the switch's full switching capabilities. How to configure the switch is described in detail in the *AT-9900 Series Software Reference.*

RS-232 Terminal Port (ASYN0)

This section introduces the switch's RS-232 Terminal Port (ASYN0), including its pin assignment and purpose.

The RS-232 ASYN0 Terminal Port is used to connect the switch to a management device for initial configuration and switch management tasks. This allows the switch's software to be accessed from a terminal, or a PC running terminal emulation software. You can also use ASYN0 to establish a network connection from a remote site using SLIP and a modem.

ASYN0 has an RJ-45 socket with an industry recognised pinout. This requires the use of a straight-through RJ-45 cable with an RJ-45 DB9 connector when the switch is connected to a terminal or PC. The socket is wired as a DTE and the pin roles are shown in Figure 1-5 on page 18 and listed in Table 1-4 on page 18.

For more information on suitable cables to use with ASYN0 see "Useful Cables" on page 19.

Figure 1-5: RS-232 Terminal Port Pin Numbers

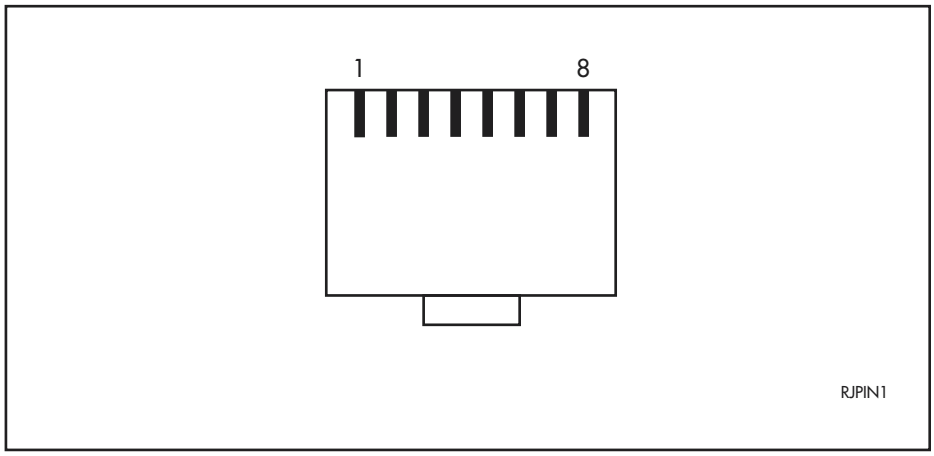


Table 1-4: Internal DTE pin roles

Pin	Role
1	RTS
2	DTR[1]
3	TXD
4	GND
5	GND
6	RXD
7	DSR[1]
8	CTS

1. DTR and DSR are connected together but have no other internal connection.

Useful Cables

This section describes how to make management, test, and network cables for use with the switch's RS-232 (ASYN0) and RJ-45 interfaces.

RS-232 terminal and modem cables

The terminal and modem cables described in this section are:

- RS-232 RJ-45 to DB9 female terminal cable
- RS-232 RJ-45 to DB9 male modem cable

How to wire cables to connect a standard VT100 compatible terminal, or a modem, to ASYN0 is shown in Figure 1-6 on page 19 and Figure 1-7 on page 20.

Figure 1-6: Pin wiring diagram for a standard DB9 male to female terminal cable.

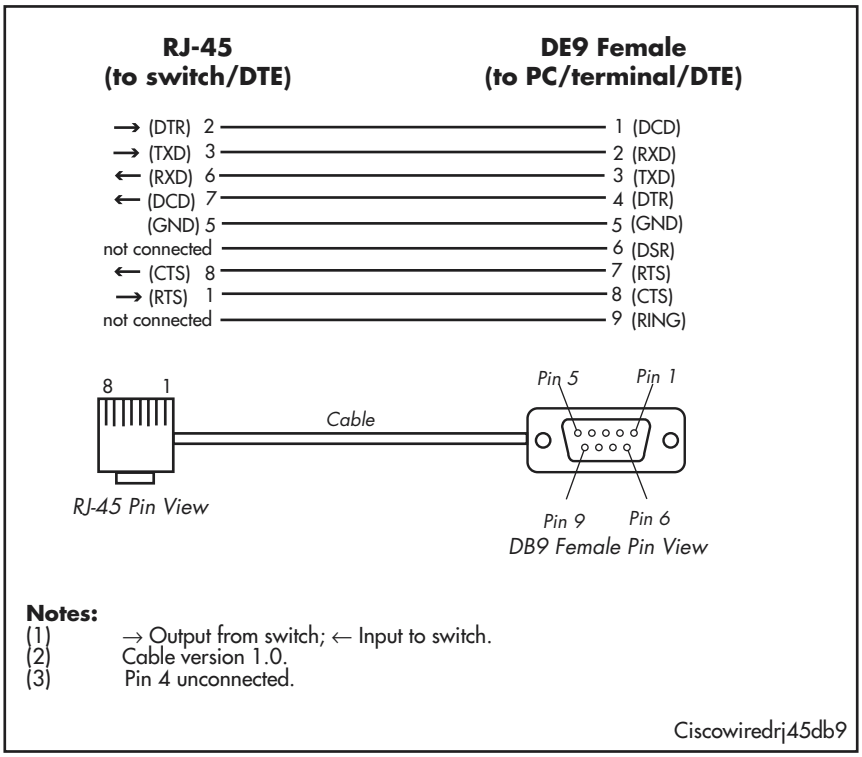
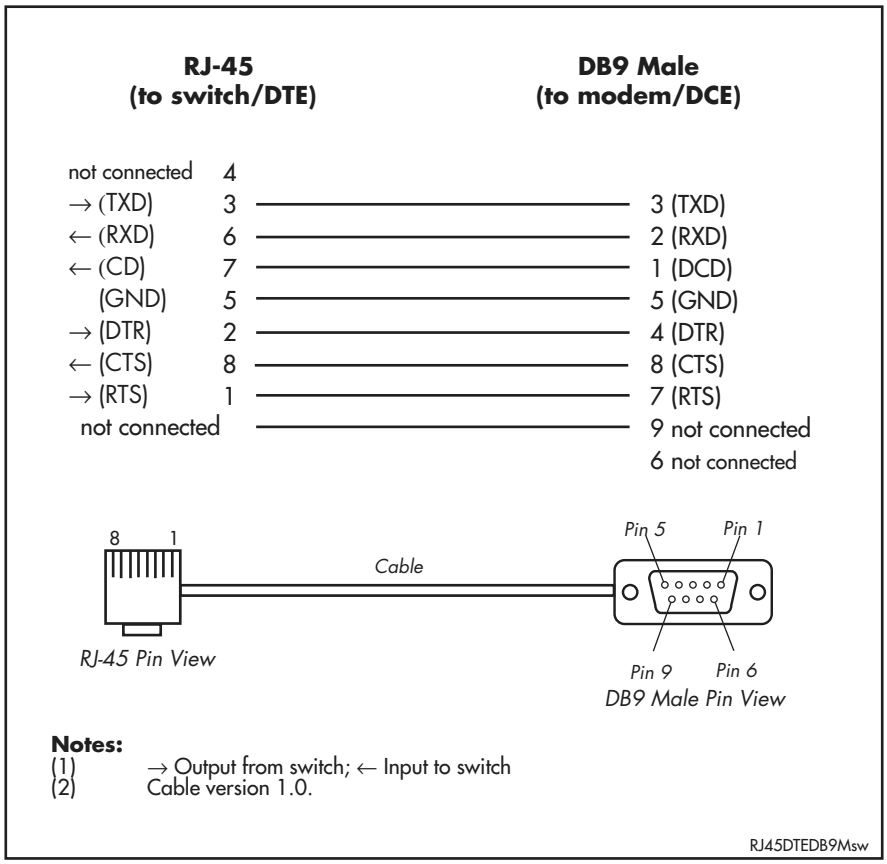


Figure 1-7: Pin wiring diagram for a DCE RS-232 Terminal Port (DB9 male connector) male to male modem cable.



For more information on pin assignments for the RS-232 Terminal Port see "RS-232 Terminal Port (ASYN0)" on page 18.

Cables for RJ-45 Ethernet LAN interfaces

Warning Do not plug a phone jack into any RJ-45 port because you could damage the switch. Use only twisted pair cables with RJ-45 connectors.

For 10BASE-T/100BASE-TX/1000BASE-T connections, a twisted pair cable with four pairs and RJ-45 connectors must be used.

The cables used for network connections and testing of RJ-45 interfaces are listed below.

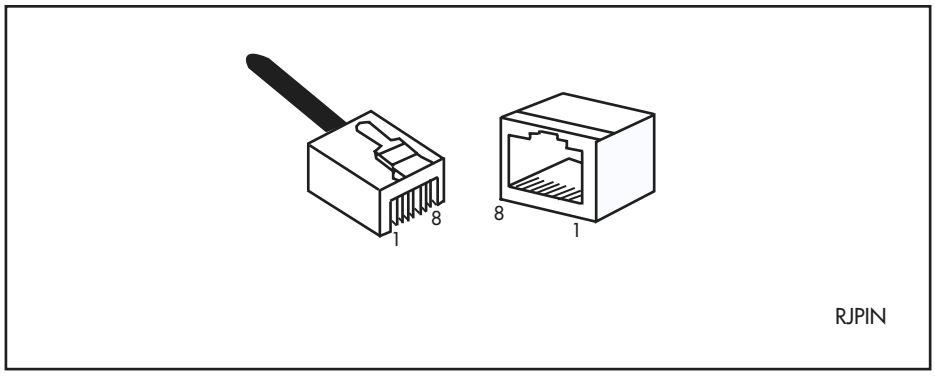
Table 1-5: Cables for RJ-45 LAN interfaces

Purpose	Interface type	Cable type	Pairs	Pin assignment
Network	10/100/1000BASE	Straight-through	Four	See Table 1-6 on page 21
Test	10/100/1000BASE	Crossover or straight through	Four	See Table 1-7 on page 22 or Table 1-6 on page 21

Pin assignments

For twisted pair cables, each pair is identified by two different colours. For example, one wire might be red, and the other red with a white stripe. A RJ-45 connector must be fitted to both ends of the cable. The pin layout for RJ-45 connectors is illustrated below.

Figure 1-8: RJ-45 Pin layout



1000BASE straight-through cable

For 1000BASE network connections, all four pairs are used and the cable is wired in a straight-through configuration. You can use this cable in conjunction with the software test facility to test 1000BASE network ports. The pin assignments are shown in the table below.

Table 1-6: Pin assignments, 10/100/1000BASE-T RJ-45 four pair straight-through cable

End 1		**End 2**	
Pin	**Pair**	**Pin**	**Pair**
1	Pair 1+	1	Pair 1+
2	Pair 1-	2	Pair 1-
3	Pair 2+	3	Pair 2+
6	Pair 2-	6	Pair 2-
4	Pair 3+	4	Pair 3+
5	Pair 3-	5	Pair 3-
7	Pair 4+	7	Pair 4+
8	Pair 4-	8	Pair 4-

1000BASE crossover cable

For 1000BASE test cables, all four pairs are used and the cable is wired in either a crossover or straight-through configuration. Table 1-7 on page 22 lists the pin assignments for a crossover cable.

Table 1-7: Pin assignments, 10/100/1000BASE-T RJ-45 four pair crossover cable

End 1		End 2	
Pin	**Pair**	**Pin**	**Pair**
1	Pair 1+	1	Pair 2+
2	Pair 1-	2	Pair 2-
3	Pair 2+	3	Pair 1+
6	Pair 2-	6	Pair 1-
4	Pair 3+	4	Pair 4+
5	Pair 3-	5	Pair 4-
7	Pair 4+	7	Pair 3+
8	Pair 4-	8	Pair 3-

Port, Connector, and Cable Combinations

The cable guidelines for each switch model are shown below.

Table 1-8: Cable guidelines for AT-9900 Series switches

Model	Port Type	Connector Type	Cable Type[1]	Maximum Cable Length
AT-9924T/4SP AT-9924T	10BASE-T 100BASE-TX 1000BASE-T	RJ-45	CAT5 CAT5E	120 m Max
AT-9924T/4SP AT-9924T AT-9924SP	1000BASE-X	Varies with SFP	Refer to SFP user documentation packaged with SFP	Refer to SFP user documentation packaged with SFP

1. Refer to the IEEE 802.3 standards for further cable information.

LEDs and What They Mean

How the LEDs on AT-9900 Series switches report faults and operational activities are described are described in Table 1-9 on page 23, Table 1-10 on page 24, and Table 1-11 on page 24.

How the LEDs on power supply units (AT-PWR01) and fan only modules (AT-FAN01) report faults and operational activities are described in Table 1-12 on page 25.

System LEDs

Table 1-9: System LEDs on all AT-9900 Series switches

LED	State	Function
PSU 1	Green	PSU 1 is installed and supplying power to the switch, and the voltage output is within specification.
	Red	PSU 1 is installed in the switch and either a fan has failed, or the PSU has exceeded its recommend temperature threshold of 75° C (167° F). A FOM is installed in the switch and a fan has failed. The bay is empty.
	Not lit	A FOM is installed and the fan is good.
PSU 2	Green	PSU 2 is installed and supplying power to the switch, and the voltage output is within specification.
	Red	PSU 2 is installed in the switch and either a fan has failed, or the PSU has exceeded its recommend temperature threshold of 75° C (167° F). A FOM is installed in the switch and a fan has failed. The bay is empty.
	Not lit	A FOM is installed and the fan is good.

Table 1-9: System LEDs on all AT-9900 Series switches (Continued)

LED	State	Function
Fault	Red	The switch or management software is malfunctioning.
	1 Flash	One or more heatsink fans has failed or is operating below the recommended speed.
	6 Flashes [1]	The switch's temperature has exceeded the recommended threshold.
	Slow flashing at startup	The SDRAM (DIMM) has not been detected.
	Rapid flashing at startup	The SDRAM (DIMM) is not compatible with the switch.
CF	Green	The CompactFlash memory is active. Do not eject the flash memory module.

1. If the switch exceeds the temperature alarm threshold the fault LED will flash six times, turn off for a short period, and then repeat the flashing sequence.

AT-9900 Series port LEDs

Table 1-10: SFP Port LEDs on all AT-9900 Series switches

LED	State	Function
L/A (Link activity)	Green	A SFP transceiver is installed and a link is open.
	Flashing green	A SFP transceiver is installed and link activity is occurring.
	Amber	A SFP transceiver is installed but a link is not open.
	Flashing amber	A SFP transceiver is installed but there is a transmission fault.

Table 1-11: Ethernet Port LEDs on all AT-9900 Series Switches

LED	State	Function
L/A (Link activity)	Green	A 1000 Mbps link is open.
	Flashing green	1000 Mbps activity is occurring.
	Amber	A 10/100 Mbps link is open.
	Flashing amber	10/100 Mbps activity is occurring..
D/C (Duplex/collision)	Green	The port is operating in full duplex mode.
	Amber	The port is operating in half duplex mode.
	Flashing amber	Collisions are occurring.

PSU and FOM LEDs

Table 1-12: LEDs on the AT-PWR01 and AT-FAN01

LED	State	Function
Fault	Red	There is either a fan failure, or the temperature has exceeded the limit of 70° C (158° F).
PWR	Green	A PSU is installed in the switch and is receiving power. The FOM does not have this LED.

Power Supply Units (PSUs)

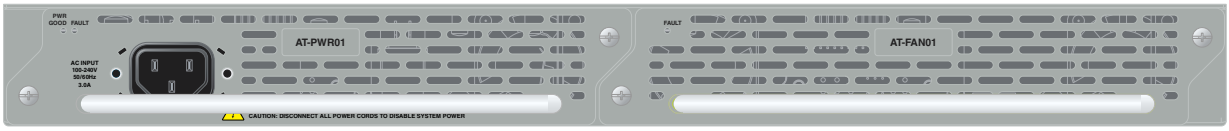
At the rear of the AT-9900 Series switch chassis are two power supply bays.

AT9924T and AT-9924SP switches are supplied with a single PSU, either AC or DC, and a blanking panel covering one PSU bay pre-installed at the factory as standard.

AT-9924T/4SP switches are supplied with a single PSU, either AC or DC, and a FOM pre-installed at the factory as standard.

The figure below shows an AT-9900 Series switch with a PSU and FOM installed.

Figure 1-9: Rear panel of the AT-9900 Series switch



PSUs are hot-swappable and when two PSU are fitted they will load share. If you install two PSUs this allows for power supply redundancy.

Both AC and DC power supplies are available. However, combinations of AC and DC power supplies are not supported.

Each PSU and FOM contains an EPROM allowing for command line interface identification of the modules. The EPROM will contain information including the type of module, serial number and revision of the PSU. This information will be available through the command line interface.

PSU specifications are described in "Power supply units" on page 5.

LEDS on the PSU and FOM are described in"LEDs and What They Mean" on page 23.

How to install a PSU or FOM in the switch is described in the *AT-PWR01 Quick Install Guide*.

Approved PSUs and FOM

The part numbers for the PSUs and the FOM that can be fitted in AT-9900 Series switches are:

- AT-PWR01 (either AC or DC power supply unit)
- AT-FAN01 (fan only module)

To order additional power supply units, contact your authorised authorised distributor or reseller for more information, or visit http:// www.alliedtelesyn.co.nz/support.

Network Processor Accelerator Card

Warning Only authorised service personnel should install a network processor accelerator card. Unauthorised opening of the switch's lid may cause danger of injury from electric shock, cause damage to the switch, and will invalidate the product warranty.

What is an accelerator card?

The network processor accelerator card is an optional plug-in card for the AT-9924T/4SP switch that provides accelerated IPv6 unicast and multicast routing in hardware.

Approved network processor accelerator card

The part number for the accelerator card approved for use with the AT-9900 Series switch is:

- AT-ACC01 network processor accelerator card

Note For full functionality of the network processor accelerator card 512MB SDRAM must be installed in the switch.

How an accelerator card works

The AT-ACC01 network processor accelerator card provides acceleration of routed IPv6 unicast and multicast packets. When the switch receives an IPv6 packet to route, the packet is sent to the accelerator card. The packet is then processed by the accelerator card and sent out the correct port, with appropriate alterations to the packet. Other IPv6 functions are passed on to software, such as routing protocol control packets, encryption, authentication, and Hop-by-Hop headers.

You do not need to configure the accelerator card for the card to function. The accelerator card is enabled at installation.

You can disable the accelerator card and the switch then performs IPv6 routing in software.

To enable Quality of Service (QoS) functionality on the accelerator card use the hardware filter and the QoS commands. Detailed information about QoS functionality and hardware filters is in the *Quality of Service (QoS)* and *Switching* chapters of the *AT-9900 Series Software Reference*.

How to check if an accelerator card is installed correctly

To confirm that the accelerator card is installed and operating correctly check that the switch has recognised the card. Turn on the switch and enter the command:

```
show system
```

to display system information. An example output is shown in Figure 1-10 on page 27.

Figure 1-10: Example output from the **show system** command

```
Switch System Status                                Time 09:35:29 Date 18-Aug-2004.
Board      ID Bay Board Name                         Host Id Rev    Serial number
-------------------------------------------------------------------------------
Base       220      9924T/4SP                              0 P2-0   61117541
PSU        212   1  AT-PWR01-AC                            0 P3-0   58494950
PSU        214   2  AT-FAN01                               0 P3-0   6844346
-------------------------------------------------------------------------------
Memory -   DRAM :262144 kB    FLASH : 16384 kB
-------------------------------------------------------------------------------
SysDescription
CentreCOM 9924T/4SP version 2.7.0-00 13-Jul-2004
SysContact

SysLocation

SysName

SysDistName

SysUpTime
265270 ( 00:44:12 )
Boot Image      : at9924bt.fbr size 1005336 10-Jul-2004
Software Version: 2.7.0-00 13-Jul-2004
Release Version : 2.7.0-00 13-Jul-2004
Release built   : Aug 15 2004 at 15:32:47
Patch Installed : NONE
Territory       : japan
Help File       : help.hlp

PSU1: (AC)     Fan: Normal  Temp: Normal  Power: Normal
PSU2: (FAN)    Fan: Normal

Current temperature : Normal
-----------------

Configuration
Boot configuration file: flash:swload.cfg (exists)
Current configuration: flash:swload.cfg

Security Mode   : Disabled

Warning (2048284): No patches found.
```

The first section of the output shows details of the boards installed in the switch. There should details of the switch base card, the accelerator card if installed, and the type of power supply unit or fan only module installed. Both the part names and the serial numbers of the base card and accelerator card should be displayed.

If there is no entry for the accelerator card then the switch's boot process has not correctly detected the accelerator card's presence. The most likely cause is that the accelerator card is not correctly plugged into the slot on the switch's base board.

Contact your authorised Allied Telesyn distributor or reseller if an accelerator card is installed in your switch but the correct details are not displayed in the output of the **show system** command.

Record the details of both the base card on the switch and the network processor accelerator card for later reference. If you have any difficulty with the network processor accelerator card at any time, contact your authorised distributor or reseller and quote the serial numbers of both the base card on the switch and the network processor accelerator card.

How to display information about the accelerator card

To display information about the accelerator card's status and memory, use the command:

```
show switch accelerator
```

Figure 1-11: Example output from the **show switch accelerator** command

```
Switch Accelerator Configuration
------------------------------------------------------------------------
Hardware Type ..............  AT-ACC01
Mode .......................  IPv6 Acceleration
Status .....................  IPv6 active
Search memory size .........  128 Mb
Counter memory size ........  2 Mb
------------------------------------------------------------------------
```

Small Form Factor Pluggable (SFP) Transceivers

AT-9900 Series switches have 1000BASE-X Small Form Factor Pluggable (SFP) uplink sockets on their front panel. The AT-9924T/4SP and AT-9924T have four SFP sockets and the AT-9924SP has 24 SFP sockets.

Certain fibre and copper SFP transceivers are supported. This allows you to interchange port types to meet changing network requirements. SFP transceivers are hot swappable.

Approved SFP transceivers

A range of SFP transceivers have been tested and approved for use with the AT-9900 Series Switches. You can purchase SFP transceivers when you purchase a switch, or order them separately as needed.

These SFP transceivers have been approved for use with AT-9900 Series switches:

- AT-MG8T 100m Base-T SFP
- AT-MG8SX 550m SX SFP
- AT-MG8LX10 10km LX SFP
- AT-MGZX 70km ZX SFP

For the latest list of approved SFP transceivers either contact your authorised distributor or reseller, or visit *http:// www.alliedtelesyn.co.nz/support*.

SFP port operation

How a Small Form Factor Pluggable (SFP) port operates depends on the type of SFP transceiver installed in the port.

For a SFP port with an approved fibre SFP transceiver installed, the speed and duplex setting is fixed at 1000Mbps full duplex autonegotiation.

For a SFP port with an approved copper SFP transceiver installed, the available speed and duplex settings are:

- 10Mbps and 100Mbps half duplex
- 10Mbps and 100Mbps half duplex autonegotiation
- 10Mbps and 100Mbps full duplex
- 10Mbps and 100Mbps full duplex autonegotiation
- 1000Mbps full duplex autonegotiation

An error message is displayed if a SFP port cannot operate at the specified speed or duplex mode.

SFP port and RJ-45 port operation

On AT-9924T/4SP and AT-9924T switches, 24 ports are operational at one time out of a total of four SFP ports and 24 RJ-45 ports.

The RJ-45 ports 1 to 4 use the same physical interface as the SFP ports 1 to 4. When a SFP is inserted, the corresponding RJ-45 port is disabled. For example, if a SFP is inserted in SFP port 1 then RJ-45 port 1 is disabled. All other RJ-45 ports function as normal and when the SFP is removed from port 1 the RJ-45 port 1 is operational.

How to install and remove a SFP transceiver

Warning Do not look into SFP cables or transceivers. Invisible laser radiation may be emitted from disconnected fibres or connectors.

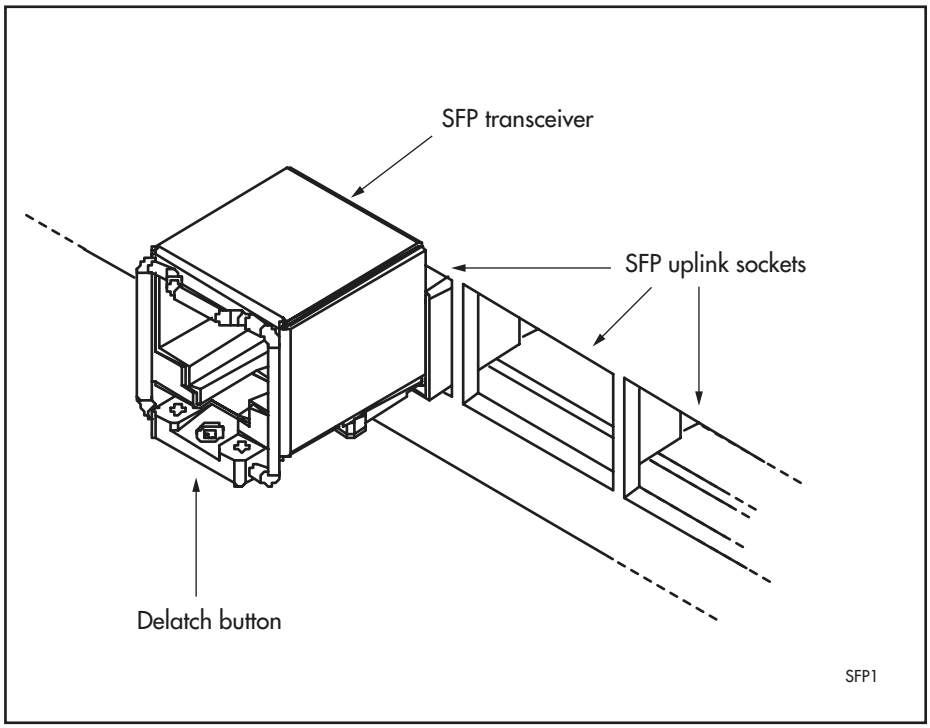
To install a SFP transceiver:

- Ensure the SFP transceiver is the correct way up, with the delatch button to the bottom (Figure 1-12 on page 30)
- Slide the SFP transceiver into the SFP socket
- Press the SFP transceiver firmly into place

To remove a SFP transceiver:

- Pull the button at the bottom of the SFP transceiver in to delatch the SFP transceiver
- Pull the SFP transceiver gently out of the SFP socket

Figure 1-12: SFP transceiver



CompactFlash

AT-9900 Series switches have a CompactFlash™ socket on their front panel. CompactFlash cards increase the flash memory available for file storage.

You can manipulate compact flash files using the command line interface (CLI). Any type of data, including releases, patches, GUIs and configurations can be stored on CompactFlash cards. However, release, patch, and GUI files cannot be run directly from compact flash. These files must be loaded into either NVS or onboard flash.

Warning Data contained on CompactFlash cards can be read with any compliant reader. Do not keep sensitive data, for example keys, on CompactFlash cards.

Approved CompactFlash cards

These CompactFlash cards have been approved for use with the AT-9900 Series switch:

- AT-CF032A-*nnn* 32MB CompactFlash card
- AT-CF064A-*nnn* 64MB CompactFlash card
- AT-CF128A-*nnn* 128MB CompactFlash card

Where *n* is the number of cards in a package, less than 1000. A package containing one card is 001.

For the latest list of approved CompactFlash cards either contact your authorised distributor or reseller, or visit *http:// www.alliedtelesyn.co.nz/support*.

For the latest list of approved CompactFlash cards contact your authorised distributor or reseller.

Note CompactFlash cards used on the switch must support a hardware access time of no more than 100 nanoseconds. If a CompactFlash card does not meet the 100 nanosecond requirement it may not work as this is the maximum bus timing allowed.

How to install and remove a CompactFlash card

You can insert a CompactFlash card into the CompactFlash slot at any time. Approximately two seconds are required for an inserted card to be initialise. CLI messages are displayed when a card is inserted or removed. Messages notify the user when a card has been inserted:

```
Info (1106257): Compact flash card inserted.
```

and when the card is ready for use:

```
Info (1106268): Compact flash card initialisation successful.
```

A message notifies the user if the CompactFlash card is not compatible with the switch:

```
Info (3106300): Compact flash card initialisation
   unsuccessful.
```

When compact flash is in use, the CF (compact flash activity) LED on the front panel of the switch is green.

Warning Do not remove the CompactFlash card when the card is being written to (that is, when the CF (compact flash activity) LED is lit). Doing so will corrupt data on the file being written.

How to test a CompactFlash card

To display information about the basic state of a CompactFlash card, including card size, file count and serial number, insert the card and enter the command:

```
show cflash
```

To display cluster ranges on a card, insert the card and enter:

```
show cflash test
```

An example output is shown below.

Figure 1-13: Output from the **show cflash test** command, when no test is running

```
Clusters available for testing
        Ranges:
               [42645--61944]
        Number of free clusters  = 19300
        Number of ranges         = 1
        Number of used clusters  = 42645
```

To test a card, insert the card and enter:

```
enable cflash test start=startnumber end=endnumber
```

where *startnumber* and *endnumber* are positive integers within a cluster range. The endnumber must be higher than the startnumber. Cluster ranges are displayed in the output of the **show cflash test** command (Figure 1-13 on page 32).

The test software will read the file allocation table and display a list of free sectors. Sectors can be tested as single sectors or as a range. The test will consist of a write/read/verify cycle.

To stop the test, use the command:

```
disable cflash test
```

To display the testing process while a test is in process, enter:

```
show cflash test
```

An example output is shown below.

Figure 1-14: Output from the **show cflash test** command, when a test is running

```
Test Progress
        Starting cluster          = 700
        Ending cluster            = 1700
        Current cluster           = 1185

        Passed clusters number    = 485
        Passed sectors  number    = 1940

        Failed clusters number  = 0
        Failed sectors  number    = 0
        Used Clusters encountered = 0

        Duration.................  4417 ms
```

If used when testing is not active, the previous command displays blank cluster ranges on a CompactFlash card (Figure 1-13 on page 32).

Error messages are displayed when a file write fails. Failure could be due to the card being removed or an error in the card.

Dual In-line Memory Modules (DIMMs)

Warning Only authorised service personnel should install DIMM. Unauthorised opening of the switch's lid may cause danger of injury from electric shock and may cause damage to the switch.

Synchronous DRAM for AT-9900 Series switches is provided by a single DIMM.

Approved DIMM for the AT-9924T and AT-9924SP switches

Warning Only Allied Telesyn supplied DIMMS have been tested and approved for use with AT-9900 Series switches. If you use DIMM that has not been approved this may cause unreliable operation and will invalidate the switch's warranty.

For AT-9924T or AT-9924SP switches, the following DIMM have been approved for use:

- AT-SD128A-00 128MB SDRAM (installed at factory)
- AT-SD256A-00 256MB SDRAM (upgrade)
- AT-SD512A-00 512MB SDRAM (upgrade)

Approved DIMM for the AT9924T/4SP switch

For an AT-9924T/4SP switch without an AT-ACC01 network processor accelerator card installed, the following DIMM have been approved for use:

- AT-SD256A-00 256MB SDRAM (installed at factory)
- AT-SD512A-00 512MB SDRAM (upgrade)

For an AT-9924T/4SP switch with an AT-ACC01 network processor accelerator card installed, the following DIMM is required:

- AT-SD512A-00 512MB SDRAM (installed at the factory if the switch is ordered with an AT-ACC01 fitted)

How to check if DIMM is installed correctly

The switch is unlikely to boot unless the DIMM is correctly installed. If the switch does boot but you suspect the DIMM is malfunctioning, enter the command:

```
show system
```

to display system information. An example output is shown in Figure 1-10 on page 27.

In the memory section of the output there should be an entry that shows the size of DRAM. If the DRAM size is less than the size of DIMM that has been installed, then the switch has not correctly detected the DIMM. The most likely cause is that the DIMM connector is not plugged into its slot correctly.

Contact your authorised distributor or reseller if the correct details are not displayed in the output of the **show system** command.

Record the switch's serial number and revision details for future reference. If you have any difficulty with the DIMM at any time, contact your authorised distributor or reseller and quote the serial number of the base card on the switch.

Lithium Battery

Warning Only authorised service personnel should change the lithium battery. Unauthorised opening of the switch's lid may cause danger of injury from electric shock, cause damage to the switch, and will invalidate the product warranty.

There is a danger of explosion if the lithium battery incorrectly replaced

Optional Wall-mount Kit

The wall-mount kit is purchased separately. To order a wall-mount kit, contact your authorised distributor or reseller for more information, or visit http:// www.alliedtelesyn.co.nz/support.

Warning For electrical safety requirements the switch must be mounted with the front and rear of the switch vertical.

The part number for the wall-mount kit approved for use with the AT-9900 Series switch is:

- AT-WBRKT-00

How to install a switch using the wall-mount kit

Screw the brackets to the wall with the brackets at the top and the bottom of the switch.

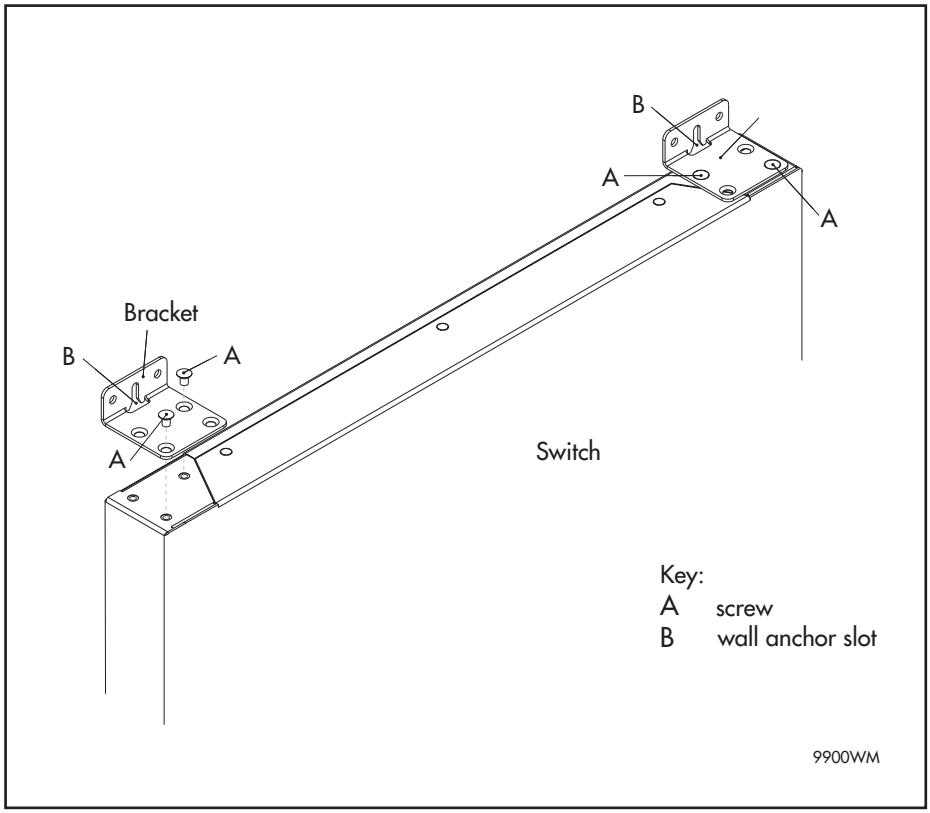
To install the switch using the wall-mount kit:

1. Ensure that there is sufficient space on the wall for the switch and its associated cables.
2. Screw the brackets to the sides of the switch using the supplied M4 screws. The switch is held by wall anchors fixed through the slots in the brackets (see Figure 1-15 on page 36).
3. Locate where on the wall you want to mount the switch and mark the position of the slots in the top brackets.

   Ensure the positions you have marked on the wall are the correct distance apart and are horizontal.
4. Fix two wall anchors in the wall, one for each bracket.
5. Hang the switch from these anchors.

   Fix additional wall anchors through the bottom brackets, 2 per bracket.
6. Ensure that all wall anchors are tightened sufficiently to secure the switch firmly against the wall.
7. Check all screws and nuts to ensure they are fully tightened.

Figure 1-15: Fitting wall-mount brackets on the switch



Virtual Cable Test

Use the Virtual Cable Test facility to diagnose the type of cable fault and the approximate distance to a cable fault. The Virtual Cable Test facility tests all four pairs of wires inside the cable and is supported on Gigabit Ethernet RJ-45 ports.

The AT9924T and AT9924T/4SP switches support this feature.

How to use the Virtual Cable Test

To locate cable faults for a specific port or all ports on the switch, use the command:

```
enable test cable [port={port-number|all}]
```

If the test is not finished in 10 seconds then the test is halted and an error message is displayed.

Warning After the **enable test cable** command is entered do not connect or disconnect the cable of the port under test. The RJ-45 ports 1 to 4 use the same physical interface as the SFP ports 1 to 4. If the RJ-45 port under test is ports 1 to 4, do not insert a SFP into a SFP port that corresponds to this port. When a SFP is inserted the corresponding RJ-45 port is disabled.

To display the cable test results for a specified port or all ports, use the command:

```
show test cable [port={port-number|all}]
```

Cable test results are reported for all four pairs of cable and are shown in “state(length)” format. Possible state values are:

- no test
- testing
- failed
- good
- short
- open

When the state is "open" or "short" the length shown is the approximate distance to a fault. The accuracy of the distance to the "open" or "short" location is plus or minus two meters.

When the state is "good" the length shown indicates the approximate length of the specified pair of cables. The actual value depends on such factors as the attenuation of the cable, output levels of the remote transceiver, and connector impedance. The accuracy is plus or minus 10 meters.

Note that “good” cable length, i.e “good(length)”, is reported for ports operating at 1000Mbps. For ports operating at 10Mbps and 100Mbps, “good” is reported.

Good cable length is only reported after the gigabit link is established.

An example of the output displayed by a **show test cable** command is shown below.

Table 1-13: Example output from the **show test cable** command

```
Port   Pair 1-2          Pair 3-6          Pair 5-4          Pair 7-8
--------------------------------------------------------------------------------
  1    no test           no test           no test           no test
  2    open(0m)          open(0m)          open(0m)          open(0m)
  3    short(1m)         good              good              good
  4    open(0m)          open(0m)          open(0m)          open(0m)
  5    open(40m)         open(40m)         open(39m)         open(40m)
  6    good              open(10m)         good              good
  7    good              good              short(81m)        short(82m)
  8    open(0m)          open(0m)          open(0m)          open(0m)
  9    good(4m)          good(4m)          good(2m)          good(2m)
  10   good              good              good              good
  11   open(0m)          open(0m)          open(0m)          open(0m)
  12   open(0m)          open(0m)          open(0m)          open(0m)
  13   good(122m)        good(123m)        good(120m)        good(126m)
  14   open(0m)          open(0m)          open(0m)          open(0m)
  15   open(0m)          open(0m)          open(0m)          open(0m)
  16   open(0m)          open(0m)          open(0m)          open(0m)
  17   open(0m)          open(0m)          open(0m)          open(0m)
  18   open(0m)          open(0m)          open(0m)          open(0m)
  19   open(0m)          open(0m)          open(0m)          open(0m)
  20   open(0m)          open(0m)          open(0m)          open(0m)
  21   open(0m)          open(0m)          open(0m)          open(0m)
  22   open(0m)          open(0m)          open(0m)          open(0m)
  23   open(0m)          open(0m)          open(0m)          open(0m)
  24   open(0m)          open(0m)          open(0m)          open(0m)
--------------------------------------------------------------------------------
```

To halt the current active cable test, use the command:

```
disable test cable
```

To clear all previous cable test results ready to start a new cable test, use the command:

```
reset test cable
```

Display Approximate Cable Length

To display the approximate cable length used by Gigabit Ethernet RJ-45 ports, use the command:

```
show switch port
```

The AT9924T and AT9924T/4SP switches support this feature.

For the port or ports specified, the **Cable Length** parameter displays the approximate cable length used by the port in meters. Possible **Cable Length** parameter values are:

- <50m
- 50-80m
- 80-110m
- 110-140m
- >140m
- - (either the port link is down, or the port is operating at either 10Mbps or 100Mbps)

Cable Length is only reported for Gigabit Ethernet RJ-45 ports after the link is established.

Test Facility

This section introduces the Test Facility. The Test Facility is built into all AT-9900 Series software. How to operate the Test Facility is described in detail in the *Test Facility* chapter of the *AT-9900 Series Software Reference*.

Any interfaces under test are dedicated to the Test Facility. Think of the Test Facility as a specialised interface module like PPP or Frame Relay.

Note Before you use the Test Facility, disable any configurations with the command **set configuration=none** and restart or reboot the switch.

How to test Ethernet LAN ports

A crossover cable is required to run an Ethernet LAN test. How to make a suitable cable is described in "Useful Cables" on page 19. To start the test, loop a four-pair crossover or straight-through cable between any two RJ-45 ports and enter:

```
enable test int=all
```

All interfaces connected by crossover cables are tested. Test results are displayed with the command:

```
show test
```

A more detailed output (with frame counts) is displayed with the command:

```
show test count
```

For example output from these commands, see the Test Facility of the *AT-9900 Series Software Reference.*

Other interface tests

Refer to the *Test Facility* of the *AT-9900 Series Software Reference* for information on how to test other interfaces.

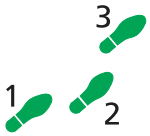
If a test fails, contact your authorised distributor or reseller.

Diagnostics

The switch software includes a set of diagnostic programs. These programs perform basic level checks of all system components. They do not run in conjunction with the normal operating code, and require that the system be totally dedicated to their use. A detailed knowledge of the way the switch hardware functions is necessary if diagnostics are to be used effectively.

Note The switch will not perform switching operations if diagnostics are running.

Warning This section is not intended as a guide to the diagnostics software. Diagnostics are designed to be run by service personnel only. For more information, contact your authorised distributor or reseller.



How to enable diagnostics mode:

1. **Connect a terminal to the RS-232 Terminal Port (ASYN0).**

   Use a terminal cable to connect a terminal to the RS-232 Port (ASYN0) on the switch. For more information on terminal cables see "Useful Cables" on page 19.

   Set the terminal communication parameters to:

   - Baud rate: 9600
   - Data bits: 8
   - Parity: None
   - Stop bits: 1
   - Flow control: Hardware

2. **Restart the switch.**

   To restart the switch use a small diameter pin to operate the recessed Reset button on the switch's front panel, or use the terminal to log in and enter the command:

   ```
   restart reboot
   ```

How to log in is described in "How to log in" on page 14.

3. **Enable diagnostics mode during start-up.**

   During the switch start-up process, at the prompt:

   ```
   Force EPROM download (Y)?
   ```

   press [Ctrl/D] on the terminal to enter diagnostics mode. A banner page is displayed on the terminal (see Figure 1-16 on page 41). Use this to check that the terminal is correctly connected.

Warning If you perform a full flash test or erase flash you will delete all configuration and release files. Make sure you know how to reload these files before you erase flash or perform a flash test.

Figure 1-16: AT-9900 Series diagnostics banner page

```
* * * Diagnostic Mode * * *

  version: 16-Mar-1998

Main Menu:
  0. Restart
  1. Full RAM test
  2. ROM checksum test
  5. Battery backed RAM test
Enter selection ==>
```

Run a diagnostic program

To run a diagnostic program, enter the corresponding letter or number (or key). There are several sub-menus to cover all the available options. The control keys for diagnostic operations are listed below.

Table 1-14: Basic commands for running the diagnostics

Key	Function
Q	Quits any running tests and displays the banner page.
S	Prints a summary of test results so far.

A reasonable understanding of the system's structure is needed to operate diagnostics and interpret the results.

To restore the switch to normal operation, use a small diameter pin to operate the recessed Reset button on the front panel of the switch, or press "0" (zero) to restart.

Troubleshooting

This section provides information on how to detect and resolve problems with AT-9900 Series switches.

Other sources of useful troubleshooting information are:

- http:// www.alliedtelesyn.co.nz/support
- The *AT-9900 Series Software Reference*.

Check these first

- Check the power cord connections.
- Check that the power supply voltage is stable.
- Check that the correct data cables are used and that their connections are secure.
- Make sure that other network devices work properly.
- Use the **show install** command to check that the latest software release is loaded. How to obtain the latest software release is described in the *AT-9900 Series Software Reference*.
- If the switch malfunctions, reboot it. Either use a small diameter pin to operate the recessed Reset button on the switch's front panel or enter the command **restart reboot**. Alternatively, shut down and restart the switch at either the mains power source (AC models) or use the Run/Standby switch on the PSU (DC models).

Link/Activity LED on any port is off

This can indicate:

- A loose data cable.
- The device at the other end of the connection does not work properly or is turned off.
- The data cable is not wired correctly.
- The network administrator has manually disabled the port through the software.
- The port's selected transmission mode does not match that of the attached device.

Perform these steps in sequence:

1. Make sure the data cable connections are secure.
2. Make sure the device at the other end of the connection is switched on and works properly.
3. Check that the data cable is wired correctly.
4. If you can, log in and check the port status. How to log in is described in "How to log in" on page 14
5. If the port is enabled, make sure the transmission speed matches that of the connected device (auto-negotiating, full or half-duplex).

Note If the port is disabled, someone has used the software to manually disable it. You should find out why the port was disabled before you enable it.

Power LED is off

This can indicate:

- A loose power cord.
- A power supply failure.
- A FOM is installed in that bay.

Perform these steps in sequence:

1. Check that the power cord connections are secure.
2. Check that all switches and circuit protection devices are in the ON position.
3. Ensure that the supply voltage is within the operational range.
   - AC models: 100 V to 240 V AC, 47 Hz to 63 Hz
   - DC models: 40 V to 60 V DC

Fault LED is on

This can indicate:

- There is a problem with the switch.
- The switch or management software is malfunctioning.
- A hardware fault is preventing switch start-up.

Perform these steps in sequence:

1. Check "LEDs and What They Mean" on page 23 for descriptions and explanations of LED flashing sequences.
2. Reset the switch. Use a small diameter pin to operate the recessed Reset button on the switch's front panel.
3. If you were attempting to download software or manage the switch via the RS-232 Terminal Port, check that connections between the Terminal Port and local terminal or PC are secure.

   If you cannot access the switch's software because of a faulty RS-232 Terminal Port connection, you can still manage the switch via Telnet or SNMP until the problem is fixed.
4. Download the latest software release. How to obtain the latest software release is described in the *AT-9900 Series Software Reference*.

Contacting Us

With locations covering all of the established markets in North America, Latin America and Europe, Allied Telesyn provides localized sales and technical support worldwide. To find our representative nearest you, visit Allied Telesyn on the web at: *http://www.alliedtelesyn.com*.